

WHAT IS CLAIMED IS:

- 1 1. A lithographic method, comprising:
2 aligning a patterned mold with respect to an alignment mark disposed on a
3 substrate based upon interaction of a scanning probe with the alignment mark.
- 1 2. The method of claim 1, wherein the patterned mold is aligned based
2 upon detection of a tunneling current between the scanning probe and the alignment
3 mark.
- 1 3. The method of claim 1, wherein the patterned mold is aligned based
2 upon detection of an interaction force generated between the scanning probe and the
3 alignment mark.
- 1 4. The method of claim 1, further comprising moving a probe near the
2 alignment mark.
- 1 5. The method of claim 4, wherein the probe is moved near the alignment
2 mark by optical alignment.
- 1 6. The method of claim 4, further comprising applying a voltage between
2 the probe and the alignment mark to induce a tunneling current between the probe
3 and the alignment mark.
- 1 7. The method of claim 4, wherein the probe has a fixed spatial position
2 relative to the patterned mold.
- 1 8. The method of claim 4, wherein the probe is carried on the patterned
2 mold.
- 1 9. The method of claim 1, further comprising urging the aligned mold into
2 a film disposed on the substrate to transfer a relief pattern to the film.
- 1 10. The method of claim 7, further comprising exposing thinned regions of
2 the transferred relief pattern.

1 11. A device formed by a lithographic method, comprising:
2 aligning a patterned mold with respect to an alignment mark disposed on a
3 substrate based upon detection of a tunneling current through the alignment mark.

1 12. A lithographic system, comprising:
2 a controller configured to align a patterned mold with respect to an alignment
3 mark disposed on a substrate based upon interaction of a scanning probe with the
4 alignment mark.

1 13. The system of claim 12, further comprising a scanning probe alignment
2 system configured to transmit to the controller position reference signals based upon
3 detection of a tunneling current between the scanning probe and the alignment
4 mark.

1 14. The system of claim 12, further comprising a scanning probe alignment
2 system configured to transmit to the controller position reference signals based upon
3 detection of an interaction force generated between the scanning probe and the
4 alignment mark.

1 15. The system of claim 12, further comprising a scanning system
2 configured to move the scanning probe near the alignment mark.

1 16. The system of claim 15, further comprising an optical alignment system
2 configured to cause the scanning system to position the probe near the alignment
3 mark.

1 17. The system of claim 15, wherein the scanning system is configured to
2 retract the scanning probe to enable the patterned mold to be urged into a film
3 disposed on the substrate to transfer a relief pattern to the film.

1 18. The system of claim 12, wherein the controller is configured to cause
2 the scanning system to urge the patterned mold into a film disposed on the substrate
3 to transfer a relief pattern to the film.

1 19. The system of claim 12, wherein the controller is configured to align
2 the patterned mold in two or more different co-planar directions.

1 20. A lithographic system, comprising:
2 a mold having a patterned surface exposed for contact with and configured to
3 be urged into a film disposed on a substrate to transfer a relief pattern to the film;
4 and
5 a probe configured to interact with a nearby alignment mark disposed on the
6 substrate.

1 21. The system of claim 19, wherein the probe is carried on the mold.